A Standards Blizzard in Sunny Hawaii!



Don Heirman, Associate Editor

awaii and the EMC Society 50th anniversary was in part celebrated by the usual bounty of standards committee meetings. This column will review all this activity including photos of many of the meetings including what ended the symposium week with the two-day meeting of the International Electrotechnical Commission (IEC) advisory committee on EMC (ACEC). First, we start with the meetings of the EMC Society Standards Committees.

Standards Development Committee (SDCom)

The Standards Development Committee (SDCom) is chaired by Steve Berger with Ed Hare as the new secretary. There were two meetings that reviewed the major activity of the committee. Here is the list of standards reviewed along with the short status of each:

- EM site survey (Std. 473): New chair Vilitas About 80 % completed
- RF absorber evaluation (Std. 1128): Reaffirmation completed
- VDT emissions (Std. 1140): Reaffirmation completed
- Gasket characterization (Std. 1302): Status being assessed
- Probe calibration (Std. 1309 amd): Action paused since WG chair resigned
- RF filter performance (P1560): Standard is current
- Computational EM (P1597.1): Ballot is expected by year end
- Intentional EMI to computers (1642): Ballot delayed
- Software Defined Radio Conformity (P1900.2): Activity increasing
- Line replaceable module (P1688): Readying first draft

- TV emission measurements (Std. 187): Needs reaffirmation or revision
- Shielding effectiveness (Std. 299.1): Two meetings held in Hawaii
- Impulse bandwidth (Std. 376): Out of date and will probably be withdrawn
- ISM measurements (Std. 139): Reaffirmation completed

There was extended discussion on two of the standards projects. Following are the further details:

The P1900 general subject of most interest is the work on interference and coexistence of transmission/reception using software defined radio.

Stephen Berger indicated that this work is now part of an IEEE Standards Association standards coordinating committee (SCC) 41, which covers Dynamic Spectrum Access Networks. He is now the chair of this committee. The focus of SCC 41 is on the improved use of spectrum. There are new techniques and methods of dynamic spectrum access which require managing interference, coordinating wireless technologies including network management and finally information sharing. P1900.2 on interference is of most interest to the EMC Society.

• P1775 which covers powerline communications equipment EMC testing.

This development work is a joint effort with members from the EMC Society, the Power Engineering Society and the Communication Society. To structure this work, there is a memorandum of understanding among all three Societies including when to go to ballot of the draft standard. In addi-



Bob Hofmann of Hofmann EMC Engineering presents at the EMC Basic Measurements Tutorial presented by the Standards Committee as Don Heirman (seated) readies his presentation.



The audience listens intently during the EMC Basic Measurements Tutorial held at EMC 2007 in Honolulu, Hawaii.



Attendees listening to the experiences of standards working group chairs at the "Experiences in Crafting EMC Standards" session in Hawaii

tion, the joint working group is comprised of four appointed representatives from each Society. If 60% of the working group approves the standard as ready for sponsor ballot, it will be balloted. As of this writing, the first standard from the joint working group is being prepared for ballot.

Standards Education and Training Committee (SETCom)

The standards education and training committee also met during the symposium week in Hawaii. The secretary, Jinliang He, chaired the meeting in the absence of chair Qiubo Ye. The goals of SETCom are the following:

- 1. Prepare and conduct seminars for working groups on the development, coordination, balloting, and support of IEEE EMC standards
- 2. Enhance the awareness of IEEE EMC standards throughout the EMC community and demonstrate how these standards can be effectively applied to the development, production and use of equipment and systems.

Future committee plans include:

- Form a complete slate and recruit members as the committee is primarily composed now of only the officers
- Solicit EMC Standards tutorial articles from experts to be published in EMC Newsletter. Note that every speaker of the tutorial that SETCom sponsored at the Hawaii symposium is invited to write an article
- Cooperate with the EMC Society Education and Student Activities Committee (ESAC) to organize Standards Tutorials
- Work with the ESAC in planning for a 1.5 hour module in the Global University should that be given again at EMC 2008
- Continue to organize Standards Workshops at the annual EMC Symposia
- Focus on a more attractive topic to build attendance (there were 45 attendees this year) such as discussing completed standards work and how it was accomplished

At the symposium itself, SETCom sponsored the session on "Experiences in Crafting EMC Standards." Following are the topics and speakers at this well attended session in Hawaii.

A Tutorial on IEEE Standard 1560 (RF filter performance) By Kermit Phipps and Philip Keebler, EPRI PEAC Corporation, Knoxville, TN, USA

IEEE Standards for the Assessment of Human Exposure



Professor Lauri Halme from Denmark (left) presents a new technique for measuring the screening effectiveness of feed through connectors and gaskets as ACEC chairman Bill Radasky looks on.

to Radiofrequency Electromagnetic Fields from Portable Wireless Devices

By Mark Douglas, Motorola Labs, Ft. Lauderdale, Florida, USA and Wolfgang Kainz, Food and Drug Administration, Rockville, Maryland, USA

Standard Technique for the Shielding Effectiveness Measurement of "Small" Enclosure: the Ongoing Project P299.1 By Maria S. Sarto, University of Rome, "La Sapienza", Italy EMC Standards in China

By Jinliang He, Tsinghua University, Beijing, China

Introduction to the Broadband Over Power Lines (BPL) Standards

By Ed Hare, W1RFI, ARRL Laboratory, Newington, CT, USA A Tutorial on IEEE Standard 1900 (Software Defined Radio)

By Stephen Berger, Austin, TX, USA

Finally, SETCom is organized with its leadership to cover different regions of the world. Chair Qiubo Ye will focus on North America and parts of Asia, Vice-Chair Johan Catrysse will focus on Europe and Secretary Jinliang He will cover China.

Standards Advisory and Coordination Committee (SACCom)

Next, the Standards Advisory and Coordination committee (SACCom) met and continued its meeting as part of the annual SACCom and Representative Advisory Committee (RAC) luncheon for the EMC Society Board of Directors. Dave Guzman is now the new chair of the committee. Please see the following article in this Newsletter, which provides further information on the luncheon activities as reported by Fred Heather. The goals of the SACCom include:

- 1. Provide technical liaison, representation and coordination between the IEEE EMC Society Standards Committee and organizations and entities involved with EMC standards activities worldwide
- 2. Monitor the activities of various standards developing



Chairman Radasky of Metatech (left) and secretary Dr. Remy Baillif of the IEC Central Office review the meeting agenda for the IEC Advisory Committee on EMC (ACEC).

organizations and entities and keep the EMC Society informed in the standards development work undertaken outside the EMC Society and vice versa

- 3. Enhance and reduce duplication of common EMC standardization
- 4. Support the EMC Society Standards Development and Education and Training Committees by providing input and to inform other organizations of their work
- 5. Provide technical liaison between the various standards organizations and entities by serving as an active member of the subject committee. In particular, the representative position is meant to provide a conduit for information of mutual interest between the particular entity and the EMC Society Standards Committee.

Basic EMC Measurements Tutorial

Another session sponsored by the EMC Society Standards Committees that dealt with standards was a tutorial that has been given for close to a decade. Approximately 50 to 60 attended this tutorial in Hawaii that serves as an introduction to basic EMC measurements with the primary focus on emission testing yet including immunity test methods. While intended for those new to these disciplines, the latest activity in national and international standards related to EMC measurements and standards were presented to also provide information to those more experienced in performing EMC measurements. The references for the presentations are the typical standards on such tests from both the American National Standards Institute (ANSI) Accredited Standards Committee C63 and the International Electrotechnical Commission (IEC). This year's edition also emphasized issues with measurements above 1 GHz. The presentations included:

Emission Measurements for Tabletop Equipment By Steve Koster, Washington Laboratories Emission Measurements for Floor-Standing Equipment By H. R. (Bob) Hofmann, Hofmann EMC Engineering IEC Transient-Immunity Testing Overview By Thomas E. Braxton, Braxton EMC Consulting



Meeting attendees deliberate on questions brought before the meeting of the IEC Advisory Committee on EMC (ACEC).

Immunity to Continuous RF Disturbances By John Maas, IBM Basic Measurement Sites, Methods, and Associated Errors By Don Heirman, Don HEIRMAN Consultants Selecting a Quality EMC Lab By Daniel D. Hoolihan, Hoolihan EMC Consulting Uncertainty Considerations in Stating Pass/Fail By Don Heirman

Other Standards Meetings

In addition to the three major standards committee meetings noted above, there were project meetings as well which also attracted many international attendees. Some of these meetings included:

P299: Shielding Effectiveness (SE) Measurements

Chair Maria Sabrina Sarto held two meetings during the symposium week, as the revision of this basic SE document will include the SE measurements of small enclosures. The chair indicated that the following was discussed: The classification of enclosures in terms of electrical dimensions instead of geometrical dimensions; the definition of the different test methods that will be described in the standard and applicable to different electrical size of enclosures; and the definition of SE to be applied in the case of "small enclosures."

As regards the classification of enclosures, the following three classes were defined:

- Electrically small enclosures
- Electrically large enclosures (more than sixty (60) modes excited)
- Resonant enclosures (one up to sixty modes excited)
- As regards the test methods, it was decided that they would be different for:
- "In situ" measurements
- Measurements inside reverberating chambers
- Measurements inside test cells (low frequency range, below 100 MHz, in which the RC-approach is not applicable) On the basis of the classifications noted above, the following



A close up of chair Bill Radasky and secretary Remy Baillif conducting the ACEC meeting in Hawaii.

sub-committees were formed:

- <u>Subcommittee 1A</u>: Deals with "in situ" enclosures, i.e. enclosures that must be tested in situ and cannot be moved into a reverberating chamber. For this type of enclosure, a testing approach similar to the existing IEEE Standard 299 should be applied. The draft of this part of the standard is already available. The use of a Vector Network Analyser (VNA) and frequency sweeping will be introduced. Chair: Peter Richeson.
- <u>Subcommittee 1B</u>: Deals with "non in situ" electrically small enclosures and low frequency range (below 100 to 200 MHz). In this case, the reverberating chamber approach cannot be used because of the low frequency range, but the use of test cells is under investigation. Chair: Kermit Phipps.
- <u>Subcommittee 2A</u>: Deals with electrically large enclosures (more than 60 modes excited) that can be tested inside a reverberating chamber. Chair: Chris Holloway.
- <u>Subcommittee 2B</u>: Deals with electrically small enclosures that can be tested inside a reverberating chamber. Chair: Andy Marvin.

As regards the last issue on the definition of SE for small enclosures, it was discussed how the definition of SE given in IEEE 299-2005 can correlate with the one given in the Std. IEC 61000-4-21 which is the test method using reverberating chambers.

As you can see, the working group made significant progress over the eight hours of meetings in Hawaii and we look for the resulting standard.

P1597 (Computational Electromagnetics Technique/Code Validation)

The P1597 working group met on 9 July at the Hilton Hawaiian Village hotel. Andy Drozd chaired the meeting. In attendance were 12 members of the working group including Vice Chair Bruce Archambeault, Secretary Chuck Bunting and Assistant Secretary Vignesh Rajamani, and Technical Editor Bonnie Brench, plus three observers/guests.

The meeting focused on the progress achieved and additional areas to be addressed on behalf of developing the P1597.2 -*Recommended Practice for Computational Electromagnetics (CEM) Computer Modeling and Simulation Applications*. As of the time of this meeting, the first draft approved by the working group was due to be completed during the mid-September timeframe with



ACEC members ask questions including, from left, Peter Kerry (Chairman of CISPR), Martin Wright (BT and chairman of CISPR SC I), Christian Verholt (Danish Standards and CENELEC representative), Don Heirman (Chairman of CISPR SC A) and Professor Ianoz of the EMC standards review committee.

the first sponsor ballot to take place shortly after that. The main areas of discussion dealt with completing the detailed descriptions and fine-tuning several key sample problem sets that are in the process of being compiled in the document. The recommended practice is essentially a compendium of problem sets that can be used by EMC analysts and computer modelers to validate the application of a particular CEM technique or code. These include benchmark problems, standard validation problems, and canonical problem sets. Both computer simulation and measured data are referenced in this document to provide a 'one-stop' handy resource of information to facilitate testing of a particular technique or code against this collection of problems for which high-quality data are available.

During the meeting, Chair Andy Drozd also provided a brief report on the status of the working group's efforts on behalf of P1597.1 - Standard for Validation of Computational Electromagnetics (CEM) Computer Modeling and Simulation. The first draft was sent this past April to the IEEE SA editor and a balloting pool was formed. Sponsor balloting for the first draft is pending, contingent on addressing several copyright issues inherent in the present version of the document. In the meantime, the EMC Society SDCom is performing an internal quick review of this first draft prior to commencing the balloting process.

Overall, there are no major outstanding technical issues, except for the need to expand on certain details for several of the problem sets. No additional committee recruitments are anticipated at this time, although anyone is welcome to participate in the face-to-face meetings and telecons of the working group, which are conducted approximately on a bi-weekly basis as the efforts of the working group culminate in the fist drafts for balloting.

Chair Andy Drozd has also requested extensions to both P1597 projects in order to allow sufficient time to respond to issues that might arise during the initial balloting and recirculation processes. The committee awaits approval from the IEEE Standards Association New Standards Committee (NESCOM) regarding this request.

P1688 (Line Replaceable Modules)

This working group met on Wednesday morning of the Symposium week. Fifteen people attended. The project involves determining compliance of products that are comprised of modules based on measurements of the emission and immuni-



Andy Marvin, convener, (second from top left) and Angela Nothofer, co-convener, (far top left) both from the University of York in the United Kingdom, held a meeting of the TEM joint task force between the CISPR and TC77 committees in Hawaii.

ty of the modules. Chair Fred Heather reported that the following took place at the Hawaii meeting. First, the minutes of the previous meeting in June in Waldorf, Maryland were reviewed. At that meeting the working group edited half the standard including making technical changes of the introduction, general methods of test, and all methods of conducted EMI testing. The Hawaii meeting picked up from that point and made technical changes to the radiated test method. In summary, both meetings accomplished setting the levels of acceptable EMI for design and test. The remaining task is the application guide in the back of the standard that will capture all the tradeoffs the working group made to derive the standard. Future teleconferences are being planned for every other month.

Task Force on Reverberation Chamber Testing

In addition to the usual EMC Society standards committee activity, there were two other EMC standards activities. The first was a meeting of the joint task force (JTF) on measurements made in a reverberation chamber. The JTF is comprised of members of the International Electrotechnical Commission (IEC) technical subcommittees SC 77B and the Special International Committee on Radio Interference (CISPR) Subcommittee A. Luk Arnaut from the United Kingdom is the chair of this task force. The standard being revised is IEC 61000-4-21. At the meeting, attended by eleven participants, the issue of how to address measurement uncertainties was discussed and various options were tabled which will be further investigated at the next meeting.

Task Force on TEM Testing

Andy Marvin (convener) and Angela Nothofer (co-convener), both from the University of York in the United Kingdom, held a meeting of the TEM joint task force between the CISPR and TC77 committees in Hawaii. The standard is IEC 61000-4-20. At the meeting, discussion was held on the determination of field homogeneity, the calibration of field probes, and measurement uncertainty calculations. The use of specific definitions of terms was deliberated. A draft CD will be prepared after the next meeting that is scheduled for the end of November 2007 in England.



EMC Society President Andy Drozd (left) presented a special award to Don Heirman at the 50th Anniversary Celebration in recognition of Mr. Heirman's 25 years of contributions to IEEE EMC Standards.

IEC Advisory Committee on EMC (ACEC)

We were especially pleased that the prestigious IEC advisory committee, ACEC, held one of their semi-annual meetings following the close of the EMC symposium on Saturday and Sunday, 14-15 July 2007 from 9:00 am until 5:00 pm. Don Heirman, VP for IEEE EMC Standards, helped to organize the meeting arrangements, and two member companies of the IEC United States National Committee (Metatech Corporation and IBM) and the IEEE EMC Society sponsored the refreshments and facilities.

The ACEC Chairman, Dr. Bill Radasky, welcomed eighteen members and guests to the two-day meeting, which covered the EMC activities of the IEC, International Telecommunications Union (ITU), International Organization for Standards (ISO), the IEEE EMC Society and other standardization bodies dealing with EMC. Some of the major topics discussed included: Power line telecommunications (PLC), broadband access systems, home networks, security of telecommunication systems dealing with electromagnetic environments, and the status of IEEE EMC standardization presented by Don Heirman.

In addition, topics of interest to three product committees of the IEC were discussed in some detail. Mr. Jean-Paul Beaudet of TC 22 reported on the EMC activities relating to stabilized power supplies and power drive systems. Professor Lauri Halme presented a new test method from TC 46; his presentation included a live demonstration of the new technique for measuring the screening effectiveness of feed-throughs and gaskets. Mr. Jim Conrad of SC 62A provided ACEC with an update of the planned EMC test levels for medical equipment where human life is at risk. These levels are substantially higher than test levels currently in IEC 60601-1-2. In addition, SC 62A is planning to develop two separate documents dealing with electromagnetic threats to electronic equipment – one will deal with safety and one will deal with "normal EMC."

Another topic for this ACEC meeting was the ongoing revision of IEC Guide 107, which is the controlling document in the IEC for writing all types of IEC EMC standards. This revision is needed due to major changes in another IEC guide (Guide 108) on the role of standards, which are basic to all specific topic standardization. Excellent progress was made during the meeting in reviewing the outstanding comments. Assignments were made to members to rewrite particular clauses and annexes. It is planned that the final draft version of the revised guide will be available at the next ACEC meeting in Erlangen, Germany in early December.

While this ACEC meeting was held in a beautiful location, the meeting was well attended and excellent progress was made. Many of the members were able to attend the IEEE EMC Symposium and also to present a workshop to the IEEE on the EMC standardization activities of the IEC. This was held at the Convention Center on Monday of the Symposium week just after the close of the afternoon session. This was an excellent example of cooperation between two of the most important organizations dealing with EMC standards – the IEC and the IEEE.

All in all, the EMC standards activity at the Symposium was a major event drawing attendance from literally around the world. EMC

Don Heirman Confirmed as IEC/CISPR Chairman

on Heirman, EMC Society Vice President for Standards, was unanimously confirmed as the next chairman of the International Electrotechnical Commission (IEC) Special International Committee on Radio Interference (CISPR) at the CISPR plenary meeting on 21 September in Sydney, Australia. His term of office started on 1 October 2007 and runs through 30 September 2012. CISPR is comprised of close to 200 EMC technical experts from over 20 nations and is responsible for EMC standards that are



used in regulatory control of product emissions to protect the use of radio services worldwide. Products which have CISPR emission, and in many cases, immunity standards include: industrial, medical, scientific, automotive, lighting, appliances, information technology, multimedia, and receivers.

Mr. Heirman has served on CISPR since 1985. He started as a member of the US delegation to CISPR, moving up to chairman of Working Group 1 of CISPR Subcommittee A (Radio Interference Measurements and Statistical Methods),



(From left) Ray Garret, a member of the Australian organizing committee of the CISPR meetings held in Sydney, as well as a member of the Australian CISPR delegation, is shown with Don Heirman, newly elected CISPR Chairman, Dr. Ralph Showers, head of the US delegation to the CISPR plenary meeting in Australia, and Peter Kerry, outgoing CISPR Chairman.

then to secretary and chairman of the overall Subcommittee A and finally to his new office as chair of all the CISPR activity. Along the way and even now, Mr. Heirman has provided valuable input as a technical expert in Subcommittee A and in Subcommittee I (Information Technology Equipment and now EMC of IT, Multimedia Equipment and Receivers).

Mr. Heirman also serves on the Technical Management Committee of the US National Committee of the IEC, is Chairman of the American National Standards Institute Accred-

ited Standards Committee C63 (on EMC), and is a member of the US technical advisory groups for CISPR Subcommittees A and I. He has chaired the EMC Society Standards Development Committee and is presently responsible for standards management as the EMC Society's Vice President of Standards. He is a member of the EMC Society Board of Directors.

The EMC Society Board of Directors wishes Don Heirman much success in his new international standards leadership role. EMC



Don Heirman (left) shakes hands with the outgoing CISPR Chairman, Peter Kerry of the United Kingdom.